

PATENT COOPERATION TREATY

PCT/EP2005/002112

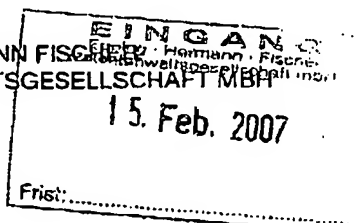
From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44bis.3(c) and 72.2)

To:

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Date of mailing (day/month/year) 08 February 2007 (08.02.2007)	
Applicant's or agent's file reference P2004,0169WO	IMPORTANT NOTIFICATION
International application No. PCT/EP2005/002112 ✓	International filing date (day/month/year) 28 February 2005 (28.02.2005) ✓
Applicant AUSTRIAMICROSYSTEMS AG et al ✓	

1. Transmittal of the translation to the applicant.

- ☐ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).
- ☒ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

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The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

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TRANSLATION PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P2004, 0169WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/EP2005/002112	International filing date (day/month/year) 28.02.2005	Priority date (day/month/year) 27.02.2004
International Patent Classification (IPC) or national classification and IPC H01L29/78, H01L29/10, H01L21/336, H01L21/266		
Applicant AUSTRIAMICROSYSTEMS AG		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of _____ sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

- a. ☒ (sent to the applicant and to the International Bureau) a total of 10 sheets, as follows:
- ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____

_____ containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. 1	Basis of the report
1.	<p>With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.</p> <p><input type="checkbox"/> This report is based on translations from the original language into the following language _____ which is the language of a translation furnished for the purposes of:</p> <p style="margin-left: 20px;"> <input type="checkbox"/> international search (Rule 12.3 and 23.1(b)) <input type="checkbox"/> publication of the international application (Rule 12.4) <input type="checkbox"/> international preliminary examination (Rule 55.2 and/or 55.3) </p>
2.	<p>With regard to the elements of the international application, this report is based on <i>(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):</i></p> <p><input type="checkbox"/> the international application as originally filed/furnished</p> <p><input checked="" type="checkbox"/> the description:</p> <p style="margin-left: 20px;"> pages: <u>1, 3-5, 7, 9, 10, 12, 14</u> as originally filed/furnished pages*: <u>2, 2a, 6, 8, 11, 13</u> received by this Authority on <u>18.01.2006 with letter of 18.01.2006</u> pages*: _____ received by this Authority on _____ </p> <p><input checked="" type="checkbox"/> the claims:</p> <p style="margin-left: 20px;"> nos. _____ as originally filed/furnished nos.* _____ as amended (together with any statement) under Article 19 nos.* <u>1-19</u> received by this Authority on <u>18.01.2006 with letter of 18.01.2006</u> nos.* _____ received by this Authority on _____ </p> <p><input checked="" type="checkbox"/> the drawings:</p> <p style="margin-left: 20px;"> sheets <u>1/3-3/3</u> as originally filed/furnished sheets*: _____ received by this Authority on _____ sheets*: _____ received by this Authority on _____ </p> <p><input type="checkbox"/> a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.</p>
3.	<p><input checked="" type="checkbox"/> The amendments have resulted in the cancellation of:</p> <p style="margin-left: 20px;"> <input type="checkbox"/> the description, pages _____ <input checked="" type="checkbox"/> the claims, nos. <u>20</u> <input type="checkbox"/> the drawings, sheets/figs _____ <input type="checkbox"/> the sequence listing (specify): _____ <input type="checkbox"/> any table(s) related to sequence listing (specify): _____ </p>
4.	<p><input type="checkbox"/> This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).</p> <p style="margin-left: 20px;"> <input type="checkbox"/> the description, pages _____ <input type="checkbox"/> the claims, nos. _____ <input type="checkbox"/> the drawings, sheets/figs _____ <input type="checkbox"/> the sequence listing (specify): _____ <input type="checkbox"/> any table(s) related to sequence listing (specify): _____ </p>

* Item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 1-16

YES

Claims 17-19

NO

Inventive step (IS)

Claims 1-16

YES

Claims 17-19

NO

Industrial applicability (IA)

Claims 1-19

YES

Claims

NO

2. Citations and explanations (Rule 70.7)

1. Reference is made to the following documents:

D1 = EP-A-0 973 205

D2 = International Electron Devices Meeting,
Technical Digest, 1-4 December 1985, pages 154-157
(Stengl et al) XP2013050.

2. The present application does not meet the requirements of PCT Article 33(2) because the subject matter of claims 17-19, as far as it can be understood (cf. box VIII), is not novel (PCT Rule 64.1-64.3):

2.1 D1 (see column 7, line 30 - column 9, line 1 and figures 1-6, particularly figure 3) discloses a method for producing an n-conductive well (20) and a p-conductive well (24) in a high-voltage PMOS transistor with a p-conductive drain region (28) in the p-conductive well (24), which is arranged in the

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

n-[conductive] well (20), in which masks or maskings are used for implicitly implanting ions so that the doping depth of the p-conductive well (24) below the provided drain [region] (28) is greater than in the direction of the source-associated well regions (cf. particularly below the field oxide (37)).

All the features of independent claim 17 are therefore known from D1, and the subject matter of claim 17 is not novel.

- 2.2 The additional features of dependent claims 18 and 19 are obviously likewise known from D1 (with regard to claim 19, cf. particularly figures 3-4, curve 2, depth b).

Consequently, the subject matter of dependent claims 18 and 19 likewise lacks the required novelty.

3. The subject matter of claims 1-16 meets the PCT requirements for novelty and inventive step (PCT Article 33(1)-33(3)):

- 3.1 Claim 1 relates to a high-voltage PMOS transistor having an insulated gate electrode, a p-conductive source region in an n-conductive well which is arranged in a p-conductive substrate, having a p-conductive drain region in a p-conductive well which is arranged in the n-well, and having a field oxide region between the gate electrode and the drain region, the depth of the n-conductive well below the drain region being less than below the source

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

region.

Such a transistor is known from D1, cf. particularly D1, figure 3.

In the case of the present transistor, the depth of the p-conductive well is also greatest below the drain region (14). This prevents premature breakdown. This feature cannot be taken from the content of D1.

- 3.2 In addition, independent claim 7 relates to a mask for producing an n-conductive well in a high-voltage PMOS transistor, in which the region of the drain provided is covered by a drain cover.

Such a mask is known implicitly from D1, cf. particularly D1, figures 1-2.

In addition, at a distance from the drain cover, the present mask has a further cover produced between the regions provided for the drain and the source. This produces the electrical field strength in the structure. This feature likewise cannot be taken from the content of D1.

- 3.3 Furthermore, independent claim 12 relates to masking to produce a p-conductive well in a high-voltage PMOS transistor, in which additional covers are provided in sections between the central region and the edge region of the well to be produced, said covers being spaced apart from one another. Such masking is known from D2, for example, cf. particularly figures 2, 5 and 6. In the case of the present masking, however, the additional covers extend from the source-side edge region to the

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

drain-side region. This reduces the electrical field strength in the structure. This feature cannot be taken from the content of D2, however.

3.4 The other available documents are less relevant.

3.5 Consequently, the subject matter of claims 1-16 is neither known from nor suggested by the prior art based on the available documents.

4. Claims 1-19 are also obviously industrially applicable.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/002112

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The application does not meet the requirements of PCT Article 6 because claims 1-19 are not clear for the following reasons or are not supported by the description:

1. The features of claim 1 are essential features of the invention. Since independent claims 7, 12 and 17 do not contain any features which correspond to all of these essential features, they do not meet the requirement of PCT Article 6 in conjunction with PCT rule 6.3(b) that each independent claim must include all the technical features essential to the definition of the invention.
2. The subject matter of independent claims 7, 12, and 17 does not correspond to the subject matter of claim 1, which leads to a lack of clarity in the claims, contrary to the requirements of PCT Article 6.
3. The feature of claim 17 "in which masks or maskings are used to ... such" and the feature of claim 19 "characterized in that the well masking ... is effected such" should be swapped with one another (PCT Article 6, clarity).